

Dr. Bernauer holds a doctoral degree in electrical engineering and a master's degree with a focus on high voltage technology, both from Karlsruhe Institute of Technology in Germany. He published over 20 technical papers. Since 2019, Dr. Bernauer has been acting as the CEO of PFIFFNER Group. Before that, he spent about 22 years with ABB in various positions: in the field of turnkey substations (engineering, sales, and project management), as the MD of the GIS business > 200 kV, and the MD of the Power Semiconductor business. He is a member of IEEE, Power & Energy Society, EMC Society, and several other business clubs and academic associations.

INTERVIEW WITH DR. JÜRGEN BERNAUER

CEO of PFIFFNER Group

Welcome to Transformers Magazine's interview with Dr. Jürgen Bernauer, CEO of PFIFFNER Group. Dr. Bernauer, I am delighted to have this opportunity to talk to you.

Thank you very much. First, a few words about **PFIFFNER GROUP**: we are a family-owned Swiss-based company. Our roots are mainly in the T&D industry, and we provide our products and services to customers from the distribution, transmission, utilities, and railway industries.

In terms of financials, PFIFFNER Group generates roughly CHF 170 million in revenue and has 900 employees. We have established our presence on the market through five brands, divided among eight different production facilities worldwide. We also have two service and solutions providers. So, we do not qualify as a super large giant, but we are one of the key players in the niche markets and a quality supplier for the T&D industry. Swissness is our key: all our Group companies have a long heritage in Switzerland. In the export business, our heritage spans close to 100 years, or even longer in the case of some individual brands.

Our first brand, **PFIFFNER**, stands for instrument transformers for AIS and GIS

applications (oil, gas, or solid insulation). We also have specific products to measure DC, voltage and current. Our portfolio ranges from low to medium and up to the highest voltage levels. For that purpose, we have five plants in different regions around the globe.

The second brand in our Group is **MOSER GLASER**, famous for having two service lines. One is insulated busbar solutions, and the second one is transformer and wall bushings up to 550 kV, with the brand name **DURESCA®**. The insulated busbar solution, as most of you know, is an alternative to a cable solution when dealing with a very condensed area and population.

Our company **ALPHA-ET** serves the market through disconnectors for high and medium voltage. It also provides railway customers with HV cable systems for rolling stock applications.

Another famous name and a pioneer in the T&D industry is **HAEFELY**, a member of our Group since 2019. HAEFELY's portfolio mainly consists of HV test systems for AC, DC, and impulse, but it also comprises measuring equipment (sensors), EMC testing, and all kinds of services, especially upgrades, repairs, and spare parts, seeing as such systems have a very long lifetime.

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Last but not least, we have a portfolio in the system business with HAVECO and PFIFFNER Systems. We provide turnkey AIS solutions, not only the products but the associated services, installation, commissioning, and repair as well.

Finally, two years ago, we also started to expand our portfolio into battery systems for low and medium-voltage applications — to those intended for industry and commercial purposes, not households.

That is all about our Group and our Group companies, in a nutshell.

Dr. Bernauer, what are the key macro trends in the electrical power grid system sector?

As we all know very well, decarbonization is driving a lot of initiatives and investments in different regions around the globe. Much technical personnel, engineers, and politicians are trying to make sure that we succeed in reducing the CO₂ footprint. I think that the most crucial point is that we must have competitive technology at our disposal for this process to be successful.

Due to how capable the industry has been in scaling up the renewables technology, solar PV and battery prices have dropped significantly in the last 10 years, meaning that renewable energy fed into the grid is getting competitive, which was not the case 15 or 20 years ago. So, scalability is of the essence when it comes to all kinds

of technologies: if we want to perform a transformation, scaling is key.

Our next question is about green transformation, so please tell us about it. Also, what are the key drivers of this transformation?

I recently attended an exhibition in Munich. It was a big event, mainly dealing with the renewables industry: solar, batteries, control systems, e-mobility, heat pipes, and so on. The conclusion was that there would be a much higher demand for electrical power. If you look at the plans of different utilities, they know that their T&D structure will have to be adapted accordingly. This is one clear trend we can observe all around the globe.

The second is DC networks, which are coming up more and more, but that is also going down to medium voltage and low voltage levels. On the high-voltage side, there are HVDC links. Maybe in 10 or 15 years from now, our households will be connected to the DC grid. That would have made Mr. Edison happy, knowing that he won the race against AC technology.

The third topic, a hot one, is EU PFAS regulation, which concerns the replacement of all PFAS chemicals. When it comes to our industry, this has an impact on the use of SF₆, which has to be reduced.

Another trend deals with the energy efficiency of T&D equipment. When

you look at the percentage of lost power — which is evaporating in our T&D equipment — it is substantial. Something has to be done to make T&D equipment more energy efficient.

Moving on, the next trend concerns cables replacing overhead lines. A lot of people are no longer in favor of overhead lines; they want everything to be underground. That is something which is a driving force for cables and the associated industry.

Also, there is the issue of renewables not always being available: the sun is going down at a certain time, and the wind is not blowing all the time. Therefore, we have flat-rated power infeed and distributed generation, exerting a new impact on our T&D customers.

And that, in the end, leads to more grid system control interventions. This is about calling for buffers: battery storage is one solution to be used as a short-time buffer. However, we, as technicians, are forced to be more intelligent and find solutions for long-term buffering of electrical energy.

Another point which I want to highlight is that we have an aging infrastructure. People are always just talking about it, but, in reality, we are seeing an ever-increasing number of substations at the end of their life; they are 35–40 years old. The customers do not want to replace everything; they want retrofits. So, in this regard, grid transformation can also be seen as a topic.

The last topic is, whether we like it or not, the fact that one of the biggest bottlenecks in our industry is the lack of technically skilled resources in Europe to manage the whole transformation. It is not just about the fact that there is a shortage of engineers, but the students in the electrical segment as well. They have a different focus and are increasingly opting for digitalization. Our T&D industry has to do something to promote this topic and act on it.

This was an excellent overview of the drivers with a major impact on what our power grids and our industry could or will look like in the future.

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Let us proceed to our next topic: solutions to support the transformation. What will these solutions be, and are any of them already available?

Firstly, and you might have already noticed this, especially if you go to Germany or the UK, is that many offshore platforms will be installed. To make them competitive and attractive to investors, you have to slim them down. When you need associated solutions to do that, there are better ones than cable. Therefore, an offshore busbar solution presents an adequate solution for such applications in offshore platforms.

The second solution is SF6-free T&D equipment. We, as a manufacturer, have to do a lot. SF6 is an ideal gas from the electrical point of view, but it has a major impact on the atmosphere. This is why we have decided to invest in F-gas-free technologies long ago. There are products, already available, for example, from the instrument transformer perspective. Also, we are currently developing

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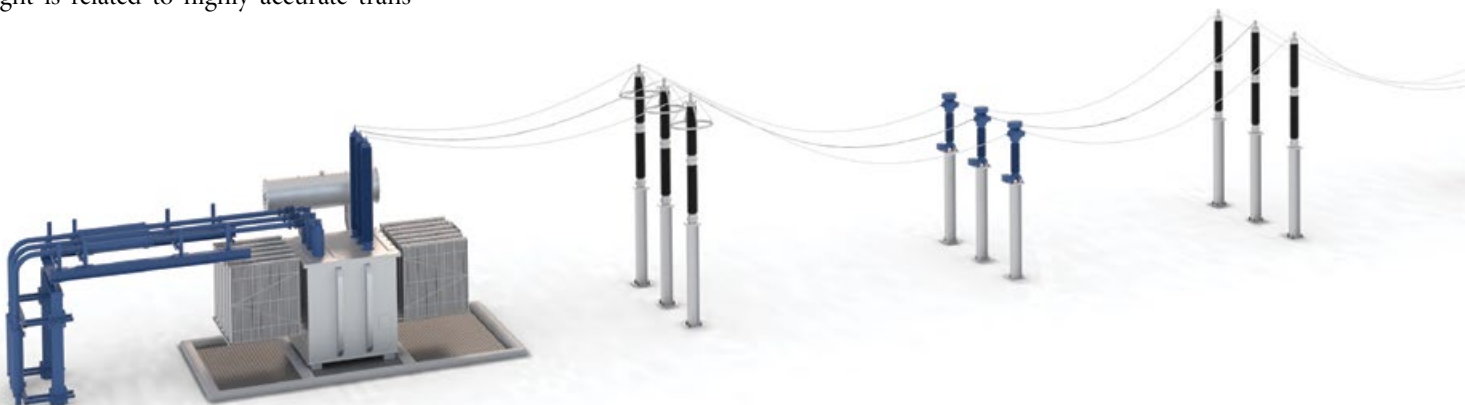
an AIS circuit breaker without any F-gas, meaning there is no SF6 or mixed gas in it.

Another solution is related to DC, as DC is getting more and more popular in DC applications. We are also starting to have an ever-increasing number of inverters in the grid, meaning there are also DC currents in the grids. Sometimes, T&D owners and operators do not know about that, so then we have to measure it. This is also why we have developed a DC current transformer, enabling us to measure what is precisely going on in both AC and DC networks.

Another solution which I want to highlight is related to highly accurate trans-

former loss measuring systems. If we wish to follow EU regulations in terms of getting better transformers and building better transformers with lower losses, we have to measure that as well. That is a challenging engineering job; it is really not easy. You need highly sophisticated measurement technology to accurately measure the velocities, and that is what we can offer. This is getting very popular, especially in the power transformer industry when it comes to the mid and lower power segments.

The next one is retrofit substation solutions. As I mentioned, customers want to keep everything around, so they often ask us if we have a retrofit solution. Most of our competitors refuse them and tell them that they must do it from scratch. However, they should listen to the customers better because they often have constraints and cannot invest resources to have everything new. Therefore, when it



comes to retrofit substation solutions, we offer excellent support to our customers.

Finally, we have battery storage solutions (BESS). So, battery storage is developing further and is becoming like any other well-known apparatus, such as a circuit breaker, instrument transformer or bushing. From that point of view, there are a lot of solutions that we have put on the market to support the transformation. I would like to thank all my engineers who contributed to that. We are proud of what we can do to enable this transformation because, in the end, it is for the benefit of all of us.

After discussing PFIFFNER's main solutions for green transformation, let us move on to our next topic.

What is PFIFFNER Group, as a big organization, doing in terms of sustainability? I know you have invested a lot in renewable energy sources. Please tell us more about these investments.

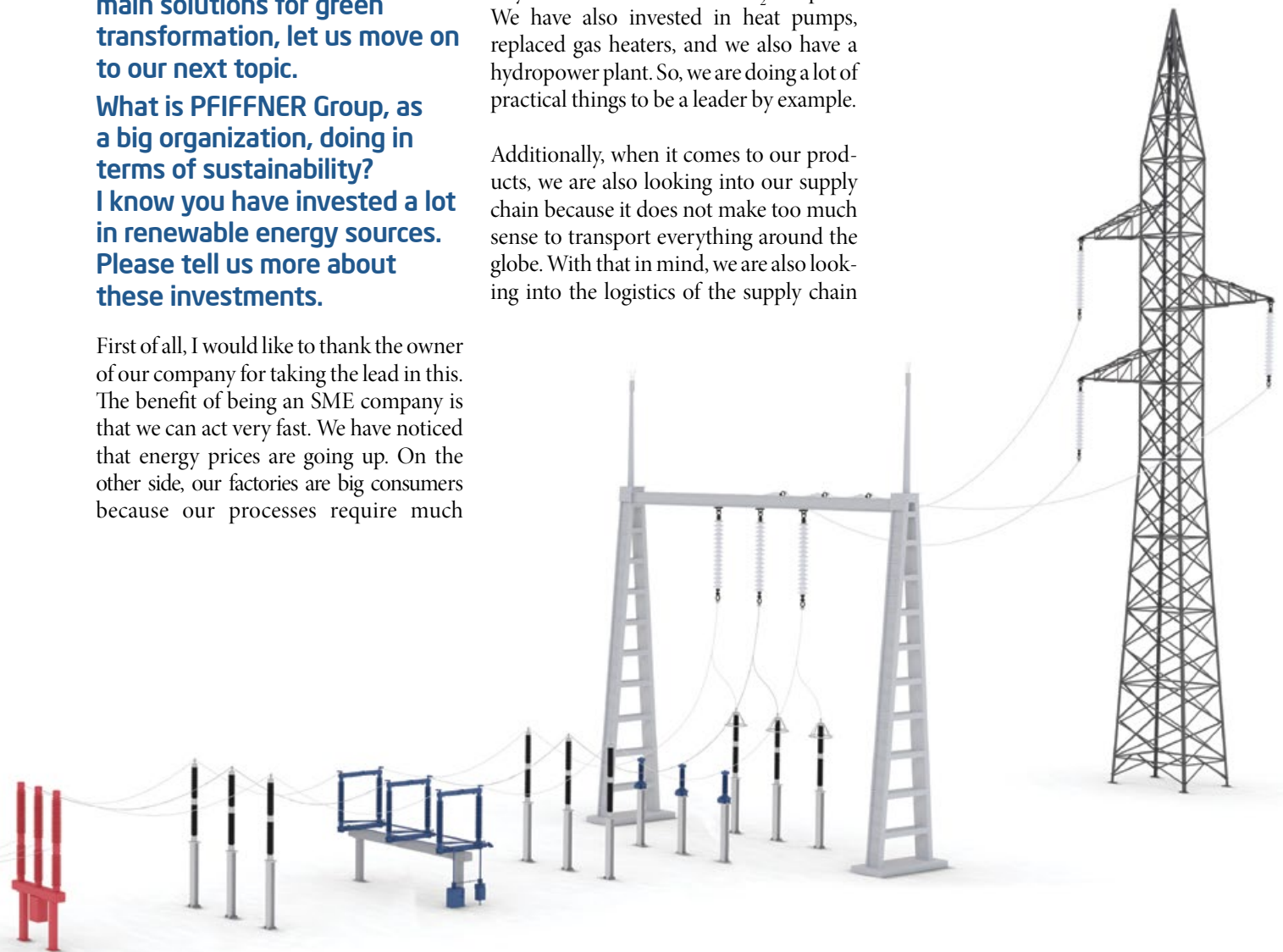
First of all, I would like to thank the owner of our company for taking the lead in this. The benefit of being an SME company is that we can act very fast. We have noticed that energy prices are going up. On the other side, our factories are big consumers because our processes require much

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electrical energy. This is why we have put solar plants with installed peak power into the different plants. I am happy to announce that we generated 2 million kWh in 2022. We are talking about solar energy, which is not free of charge, but it is out there and being harvested. This way, we have reduced our CO₂ footprint. We have also invested in heat pumps, replaced gas heaters, and we also have a hydropower plant. So, we are doing a lot of practical things to be a leader by example.

Additionally, when it comes to our products, we are also looking into our supply chain because it does not make too much sense to transport everything around the globe. With that in mind, we are also looking into the logistics of the supply chain

and the LCA footprint of our products. In this way, we have a complete solution: from investing to sensible logistics and raw materials. This enables us to make sure that we contribute to sustainability as an industry and as a leader.





PFIFFNER Group is no longer a small garage company: we are becoming a big player in our T&D industry, and we have a strong commitment to the quality and service we provide

This general overview of the actions in the field of renewable energy and sustainability brings us to our last topic for today: Swiss T&D Days 2023, a platform for collaboration between different stakeholders. Please tell us more about what is behind this platform and what you are preparing.

This is, to an extent, connected to what I mentioned before. Our T&D industry, which I have been a part of for over 30 years, is a rather conservative industry. It has not been very famous for innovations. That has led to the situation in which we find ourselves today: we lack resources in all aspects: engineering, erection, commissioning, and technical personnel. We have to counter that and do something.

To that effect, we have started taking various actions. We are working with schools, universities, and stakeholders to make sure that our industry becomes more popular, especially when it comes to convincing people that it makes a lot of sense to work in our industry. I recently talked to a lot of young people and asked them why they are choosing the solar industry and e-mobility more. They said that it made much sense, that it is fun, and so on. I told them that the T&D industry is also something to consider. They replied that they do not know what is being done there and that it is conservative and dusty. And they are right, in a way. This means that we have to change the pattern, the attitudes, the behavior, and the outlook of our industry.

This brings us to the event that we are organizing: **Swiss T&D Days 2023**, to be held over two days. The first day will be about introducing students, professors, stakeholders, engineers, customers, repre-

sentatives from politics, and so on, to each other. It will consist of three parts. During the first part, professors will talk about state-of-the-art technology and findings, and during the second part, utilities will talk about their challenges with T&D transformation. The third part will be about what we, as an industry, have to do to collaborate with universities because if we do not, all these high voltage-related universities and associations will disappear.

On the second day, we want to show the audience the innovations developed by PFIFFNER Group companies: HAEFELY, MOSER GLASER, ALPHA-ET, HAVECO, and PFIFFNER. We want to show that we are developing many innovations so that people can see that this industry is worth being in. We are trying to create and build up momentum to make our T&D industry a little more attractive than it was in the past and is currently; because, if we do not; the transformation will not happen. So, in the end, what politics is always

From the company perspective as well as my own, and based on my background, the answer is clear: R&D has to be at the core

talking about is that our T&D industry, be it transformers or substation automation, has to do its job and develop things. And therefore, we have to do something to really make our industry more popular.

We are nearing the end of our discussion. Can you please share your conclusion with us?

First of all, I would like everyone to support me in really bringing this message to the T&D industry.

So, please, share your ideas regarding the motivation to attract more people into our business with me.

As you can see, PFIFFNER Group is no longer a small garage company; we are becoming a big player in our T&D industry. We have a strong commitment to the quality and service we provide. We want to support our customers locally. We want to speak their language, and we also want to be a conversation partner for high-voltage technologies. We should be your partner in all aspects of testing, type testing, and calibration; in all aspects of our industry. That is my message for today.

Dr. Bernauer, we are at the end of our interview. I would like to thank you once again for taking part in this interview and for sharing your valuable insights. It has been a great pleasure talking to you, and I hope we will have the opportunity to speak again soon.

Thank you. I am looking forward to sharing our T&D transformation of the future with you.

Questions from the audience

What is more important for the future of the company: R&D on innovative solutions or expanding the available solutions to the existing market?

From the company perspective and my own, and based on my background, the answer is clear: R&D has to be at the core. We must be innovative and look for technical solutions with the customers. That is the key. However, on the other hand, by doing only R&D, you do not earn enough money to fund R&D, and therefore, operations is the next thing you have to spend money on, as well as CapEx. Our customers have to show us the investments in detail so that we can plan our investments. So, operational excellence and operations expenditure are also of the essence. All of that is based on the assets of our customers.

Can you disclose the percentage of revenue that you invest in R&D? Does it change over time?

It amounts to roughly 5 %, and what I can share is that this percentage is increasing. Currently, we are investing in R&D, especially in a circuit breaker. Developing a circuit breaker is very expensive, especially paying for the tests.

Also, during the last couple of years, we have invested heavily in renovating the entire HAEFELY portfolio. In MOSER GLASER, we upgraded the portfolio in bushings for 25–500 kV and ALPHA-ET disconnectors in the whole voltage range. So, our R&D expenditure is extensive, but we stand behind it. Technology is our number one priority. Of course, earning money from what we are doing is the second one, and I think the market is helping us.

Why did you choose air to replace SF6 when there are other gases available on the market? Using air for a circuit breaker means returning to the past of increasing pressure and energy in spring drives.

That is a rather good question. People always ask me whether we will stop supplying SF6 products. My answer is that we are open to technology, meaning we still provide products to the customers demanding SF6. We also supply our customers with products containing mixed gases if they ask for them. Regarding new technologies, we say that we do not want it to have any F-gas. Therefore, we have to look into these technologies. The pressure is increasing a little, but we have to manage that. However, the situation is not what we had 30–40 years ago when we had massive 200-bar breakers producing a huge noise. That is no longer the case; this technology is better.

How do you think DC and AC networks will develop in the future? For which voltage levels can you tell what is going to happen?

The voltage levels are already standardized on the AC side, whereas standardization is just starting on the DC side. The manufacturers have always set the DC voltage level, the big players that are out there. However, we should start seeing progressive development of standardization at the DC level.